FIG 1

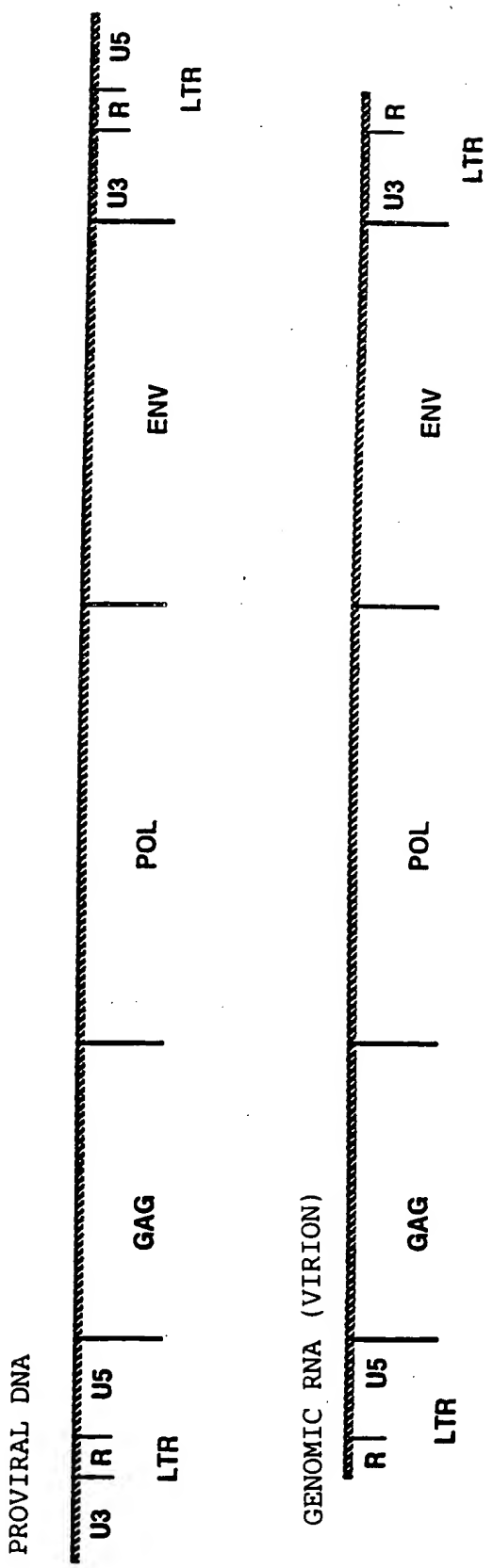

PROVIRAL DNA
U3
R
U5
LTR
GAG
POL
ENV
U3
R
U5
LTR
GENOMIC RNA (VIRION)
R
U5
LTR
GAG
POL
ENV
U3
R
LTR

FIG 2

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
GCTTATAGAA GGACCCCTAG TATGGGGTAA TCCCCTCTGG GAAACCAAGC      50
A Y R R T P S M G . S P L G N Q A
 L I E G P L V W G N P L W E T K P
  L . K D P . Y G V I P S G K P S

CCCAGTACTC AGCAGGAAAA ATAGAATAGG AAACCTCACA AGGACATACT     100
 P V L S R K N R I G N L T R T Y F
  Q Y S A G K I E . E T S Q G H T
P S T Q Q E K . N R K P H K D I L

TTCCTCCCCT CCAGATGGCT AGCCACTGAG GAAGGAAAAA TACTTTCACC     150
  P P L Q M A S H . G R K N T F T
F L P S R W L A T E E G K I L S P
 S S P P D G . P L R K E K Y F H L

TGCAGCTAAC CAACAGAAAT TACTTAAAAC CCTTCACCAA ACCTTCCACT     200
C S . P T E I T . N P S P N L P L
 A A N Q Q K L L K T L H Q T F H L
  Q L T N R N Y L K P F T K P S T

TAGGCATTGA TAGCACCCAT CAGATGGCCA AATTATTATT TACTGGACCA     250
R H . . H P S D G Q I I I Y W T R
 G I D S T H Q M A K L L F T G P
. A L I A P I R W P N Y Y L L D Q

GGCCTTTTCA AAACTATCAA GAAGATAGTC AGGGGCTGTG AAGTGTGCCA     300
  P F Q N Y Q E D S Q G L . S V P
G L F K T I K K I V R G C E V C Q
 A F S K L S R R . S G A V K C A K

AAGAAATAAT                                                 310
K K .
 R N N
  E I
```

~~FIG 2 (continued)~~

FIG 3A

```
          10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
CCCTGTATCT TTAACCTCCT TGTTAAGTTT GTCTCTTCCA GAATCAAAAC      50
P  C  I  F  N  L  L  V  K  F  V  S  S  R  I  K  T
 P  V  S  L  T  S  L  L  S  L  S  L  P  E  S  K  L
  L  Y  L  .  P  P  C  .  V  C  L  F  Q  N  Q  N

TGTAAAACTA CAAATTGTTC TTCAAATGGA GCACCAGATG GAGTCCATGA     100
 V  K  L  Q  I  V  L  Q  M  E  H  Q  M  E  S  M  T
  .  N  Y  K  L  F  F  K  W  S  T  R  W  S  P  .
C  K  T  T  N  C  S  S  N  G  A  P  D  G  V  H  D

CTAAGATCCA CCGTGGACCC CTGGACCGGC CTGCTAGCCC ATGCTCCGAT     150
  K  I  H  R  G  P  L  D  R  P  A  S  P  C  S  D
L  R  S  T  V  D  P  W  T  G  L  L  A  H  A  P  M
 .  D  P  P  W  T  P  G  P  A  C  .  P  M  L  R  C

GTTAATGACA TTGAAGGCAC CCCTCCCGAG GAAATCTCAA CTGCACAACC     200
V  N  D  I  E  G  T  P  P  E  E  I  S  T  A  Q  P
 L  M  T  L  K  A  P  L  P  R  K  S  Q  L  H  N  P
  .  .  H  .  R  H  P  S  R  G  N  L  N  C  T  T

CCTACTATGC CCCAATTCAG CGGGAAGCAG TTAGAGCGGT CATCAGCCAA     250
 L  L  C  P  N  S  A  G  S  S  .  S  G  H  Q  P  T
  Y  Y  A  P  I  Q  R  E  A  V  R  A  V  I  S  Q
P  T  M  P  Q  F  S  G  K  Q  L  E  R  S  S  A  N

CCTCCCCAAC AGCACTTGGG TTTTCCTGTT GAGAGGGGGG ACTGAGAGAC     300
  S  P  T  A  L  G  F  S  C  .  E  G  G  L  R  D
P  P  Q  Q  H  L  G  F  P  V  E  R  G  D  .  E  T
 L  P  N  S  T  W  V  F  L  L  R  G  G  T  E  R  Q

AGGACTAGCT GGATTTCCTA GGCCAACGAA GAATCCCTAA GCCTAGCTGG     350
R  T  S  W  I  S  .  A  N  E  E  S  L  S  L  A  G
 G  L  A  G  F  P  R  P  T  K  N  P  .  A  .  L  G
  D  .  L  D  F  L  G  Q  R  R  I  P  K  P  S  W
```

FIG 3B

```
         10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
GAAGGTGACT GCATCCACCT CTAAACATGG GGCTTGCAAC TTAGCTCACA    400
 K  V  T   A  S  T  S   K  H  G   A  C  N   L  A  H  T
  R  .  L   H  P  P   L  N  M  G   L  A  T   .  L  T
E  G  D  C   I  H  L   .  T  W  G   L  Q  L   S  S  H

CCCGACCAAT CAGAGAGCTC ACTAAAATGC TAATTAGGCA AAAATAGGAG    450
  R  P  I   R  E  L   T  K  M  L   I  R  Q   K  .  E
P  D  Q  S   E  S  S   L  K  C   .  L  G  K   N  R  R
 P  T  N   Q  R  A  H   .  N  A   N  .  A  K   I  G  G

GTAAAGAAAT AGCCAATCAT CTATTGCCTG AGAGCACAGC GGGAGGGACA    500
V  K  K   .  P  I  I   Y  C  L   R  A  Q  R   E  G  Q
 .  R  N   S  Q  S  S   I  A  .   E  H  S  G   R  D  K
  K  E  I   A  N  H  L   L  P  E   S  T  A  G   G  T

AGGATCGGGA TATAAACCCA GGCATTCGAG CCGGCAACGG CAACCCCCTT    550
 G  S  G   Y  K  P  R   H  S  S   R  Q  R   Q  P  P  L
  D  R  D   I  N  P  G   I  R  A   G  N  G   N  P  L
R  I  G  I   .  T  Q  A   F  E  P   A  T  A   T  P  F

TGGGTCCCCT CCCTTTGTAT GGGCGCTCTG TTTTCACTCT ATTTCACTCT    600
  G  P  L   P  L  Y  G   R  S  V   F  T  L   F  H  S
W  V  P  S   L  C  M  G   A  L  F   S  L  Y   F  T  L
 G  S  P   P  F  V  W   A  L  C   F  H  S   I  S  L  Y

ATTAAATCTT GCAACTGAAA AAAAAAAAA AAAAA                     635
I  K  S  C   N  .  K   K  K  K   K
 L  N  L   A  T  E  K   K  K  K   K
  .  I  L   Q  L  K  K   K  K  K   K
```

FIG 4A

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
ATGGCCCTCC CTTATCATAC TTTTCTCTTT ACTGTTCTCT TACCCCCTTT   50
M A L P  Y H T  F L F  T V L L  P P F
 W P S  L I I L  F S L  L F S  Y P L S
  G P P  L S Y  F S L Y  C S L  T P F

CGCTCTCACT GCACCCCCTC CATGCTGCTG TACAACCAGT AGCTCCCCTT  100
 A L T  A P P P  C C C  T T S  S S P Y
  L S L  H P L  H A A V  Q P V  A P L
R S H C  T P S  M L L  Y N Q .  L P L

ACCAAGAGTT TCTATGAAGA ACGCGGCTTC CTGGAAATAT TGATGCCCCA  150
  Q E F  L . R  T R L P  G N I  D A P
T K S F  Y E E  R G F  L E I L  M P H
 P R V  S M K N  A A S  W K Y  . C P I

TCATATAGGA GTTTATCTAA GGGAAACTCC ACCTTCACTG CCCACACCCA  200
S Y R S  L S K  G N S  T F T A  H T H
 H I G  V Y L R  E T P  P S L  P T P I
  I . E  F I .  G K L H  L H C  P H P

TATGCCCCGC AACTGCTATA ACTCTGCCAC TCTTTGCATG CATGCAAATA  250
 M P R  N C Y N  S A T  L C M  H A N T
  C P A  T A I  T L P L  F A C  M Q I
Y A P Q  L L .  L C H  S L H A  C K Y

CTCATTATTG GACAGGGAAA ATGATTAATC CTAGTTGTCC TGGAGGACTT  300
  H Y W  T G K  M I N P  S C P  G G L
L I I G  Q G K  . L I  L V V L  E D L
 S L L  D R E N  D . S  . L S  W R T W

GGAGCCACTG TCTGTTGGAC TTACTTCACC CATACCAGTA TGTCTGATGG  350
G A T V  C W T  Y F T  H T S M  S D G
 E P L  S V G L  T S P  I P V  C L M G
  S H C  L L D  L L H P  Y Q Y  V . W
```

FIG 4B

```
         10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
GGGTGGAATT CAAGGTCAGG CAAGAGAAAA ACAAGTAAAG GAAGCAATCT      400
 G  G  I   Q  G  Q  A   R  E  K   Q  V  K   E  A  I  S
  V  E  F   K  V  R   Q  E  K  N   K  *  R   K  Q  S
G  W  N  S   R  S  G   K  R  K   T  S  K  G   S  N  L

CCCAACTGAC CCGGGGACAT AGCACCCCTA GCCCCTACAA AGGACTAGTT      450
  Q  L  T   R  G  H   S  T  P  S   P  Y  K   G  L  V
P  N  *  P   G  D  I   A  P  L   A  P  T  K   D  *  F
 P  T  D   P  G  T  *   H  P  *   P  L  Q   R  T  S  S

CTCTCAAAAC TACATGAAAC CCTCCGTACC CATACTCGCC TGGTGAGCCT      500
L  S  K  L   H  E  T   L  R  T   H  T  R  L   V  S  L
 S  Q  N   Y  M  K  P   S  V  P   I  L  A   W  *  A  Y
  L  K  T   T  *  N   P  P  Y  P   Y  S  P   G  E  P

ATTTAATACC ACCCTCACTC GGCTCCATGA GGTCTCAGCC CAAAACCCTA      550
 F  N  T   T  L  T  R   L  H  E   V  S  A   Q  N  P  T
  L  I  P   P  S  L   G  S  M  R   S  Q  P   K  T  L
I  *  Y  H   P  H  S   A  P  *   G  L  S  P   K  P  Y

CTAACTGTTG GATGTGCCTC CCCCTGCACT TCAGGCCATA CATTTCAATC      600
  N  C  W   M  C  L   P  L  H  F   R  P  Y   I  S  I
L  T  V  G   C  A  S   P  C  T   S  G  H  T   F  Q  S
 *  L  L   D  V  P  P   P  A  L   Q  A  I   H  F  N  P

CCTGTTCCTG AACAATGGAA CAACTTCAGC ACAGAAATAA ACACCACTTC      650
P  V  P  E   Q  W  N   N  F  S   T  E  I  N   T  T  S
 L  F  L   N  N  G  T   T  S  A   Q  K  *   T  P  L  P
  C  S  *   T  M  E   Q  L  Q  H   R  N  K   H  H  F

CGTTTTAGTA GGACCTCTTG TTTCCAATCT GGAAATAACC CATACCTCAA      700
 V  L  V   G  P  L   V  S  N  L   E  I  T   H  T  S  N
  F  *  *   D  L  L   F  P  I  W   K  *  P   I  P  Q
R  F  S  R   T  S  C   F  Q  S   G  N  N  P   Y  L  K
```

~~FIG 4 (continued)~~

FIG 4C

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
ACCTCACCTG TGTAAAATTT AGCAATACTA TAGACACAAC CAGCTCCCAA   750
  L T C  V K F  S N T I  D T T  S S Q
T S P V  . N L  A I L  . T Q P  A P N
 P H L  C K I  .  Q Y Y  R H N  Q L P M

TGCATCAGGT GGGTAACACC TCCCACACGA ATAGTCTGCC TACCCTCAGG   800
C I R W  V T P  P T R  I V C L  P S G
 A S G  G . H L  P H E  . S A  Y P Q E
  H Q V  G N T  S H T N  S L P  T L R

AATATTTTTT GTCTGTGGTA CCTCAGCCTA TCATTGTTTG AATGGCTCTT   850
 I F F  V C G T  S A Y  H C L  N G S S
  Y F L  S V V  P Q P I  I V .  M A L
N I F C  L W Y  L S L  S L F E  W L F

CAGAATCTAT GTGCTTCCTC TCATTCTTAG TGCCCCCTAT GACCATCTAC   900
  E S M  C F L  S F L V  P P M  T I Y
Q N L C  A S S  H S .  C P L .  P S T
 R I Y  V L P L  I L S  A P Y  D H L H

ACTGAACAAG ATTTATACAA TCATGTCGTA CCTAAGCCCC ACAACAAAAG   950
T E Q D  L Y N  H V V  P K P H  N K R
 L N K  I Y T I  M S Y  L S P  T T K E
  . T R  F I Q  S C R T  . A P  Q Q K

AGTACCCATT CTTCCTTTTG TTATCAGAGC AGGAGTGCTA GGCAGACTAG  1000
 V P I  L P F V  I R A  G V L  G R L G
  Y P F  F L L  L S E Q  E C .  A D .
S T H S  S F C  Y Q S  R S A R  Q T R

GTACTGGCAT TGGCAGTATC ACAACCTCTA CTCAGTTCTA CTACAAACTA  1050
  T G I  G S I  T T S T  Q F Y  Y K L
V L A L  A V S  Q P L  L S S T  T N Y
 Y W H  W Q Y H  N L Y  S V L  L Q T I
```

FIG 4 (continued)
FIG 4D

```
          10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
TCTCAAGAAA TAAATGGTGA CATGGAACAG GTCACTGACT CCCTGGTCAC   1100
S  Q  E  I  N  G  D  M  E  Q  V  T  D  S  L  V  T
 L  K  K  .  M  V  T  W  N  R  S  L  T  P  W  S  P
  S  R  N  K  W  .  H  G  T  G  H  .  L  P  G  H

CTTGCAAGAT CAACTTAACT CCCTAGCAGC AGTAGTCCTT CAAAATCGAA   1150
 L  Q  D  Q  L  N  S  L  A  A  V  V  L  Q  N  R  R
  C  K  I  N  L  T  P  .  Q  Q  .  S  F  K  I  E
L  A  R  S  T  .  L  P  S  S  S  S  P  S  K  S  K

GAGCTTTAGA CTTGCTAACC GCCAAAAGAG GGGGAACCTG TTTATTTTTA   1200
  A  L  D  L  L  T  A  K  R  G  G  T  C  L  F  L
E  L  .  T  C  .  P  P  K  E  G  E  P  V  Y  F  .
 S  F  R  L  A  N  R  Q  K  R  G  N  L  F  I  F  R

GGAGAAGAAC GCTGTTATTA TGTTAATCAA TCCAGAATTG TCACTGAGAA   1250
G  E  E  R  C  Y  Y  V  N  Q  S  R  I  V  T  E  K
 E  K  N  A  V  I  M  L  I  N  P  E  L  S  L  R  K
  R  R  T  L  L  L  C  .  S  I  Q  N  C  H  .  E

AGTTAAAGAA ATTCGAGATC GAATACAATG TAGAGCAGAG GAGCTTCAAA   1300
V  K  E  I  R  D  R  I  Q  C  R  A  E  E  L  Q  N
 L  K  K  F  E  I  E  Y  N  V  E  Q  R  S  F  K
S  .  R  N  S  R  S  N  T  M  .  S  R  G  A  S  K

ACACCGAACG CTGGGGCCTC CTCAGCCAAT GGATGCCCTG GGTTCTCCCC   1350
  T  E  R  W  G  L  L  S  Q  W  M  P  W  V  L  P
T  P  N  A  G  A  S  S  A  N  G  C  P  G  F  S  P
 H  R  T  L  G  P  P  Q  P  M  D  A  L  G  S  P  L

TTCTTAGGAC CTCTAGCAGC TCTAATATTG TTACTCCTCT TTGGACCCTG   1400
F  L  G  P  L  A  A  L  I  L  L  L  L  F  G  P  C
 S  .  D  L  .  Q  L  .  Y  C  Y  S  S  L  D  P  V
  L  R  T  S  S  S  S  N  I  V  T  P  L  W  T  L
```

~~8 / 32~~

~~FIG 4 (continued)~~

FIG 4E

```
         10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
TATCTTTAAC CTCCTTGTTA AGTTTGTCTC TTCCAGAATT GAAGCTGTAA   1450
 I  F  N   L  L  V  K   F  V  S   S  R  I   E  A  V  K
  S  L  T   S  L  L   S  L  S  L   P  E  L   K  L  .
Y  L  .  P   P  C  .   V  C  L   F  Q  N  .   S  C  K

AGCTACAGAT GGTCTTACAA ATGGAACCCC A                      1481
  L  Q  M   V  L  Q   M  E  P
S  Y  R  W   S  Y  K   W  N  P
 A  T  D   G  L  T  N   G  T  P
```

FIG 5 A

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
TCAAAATCGA AGAGCTTTAG ACTTGCTAAC CGCCAAAAGA GGGGGAACCT      50
S K S K  S F R  L A N  R Q K R  G N L
 Q N R  R A L D  L L T  A K R  G G T C
  K I E  E L .  T C .  P P K E  G E P

GTTTATTTTT AGGGGAAGAA TGCTGTTAGT ATGTTAATCA ATCTGGAATC     100
 F I F  R G R M  L L V  C . S  I W N H
  L F L  G E E  C C .  Y V N Q  S G I
V Y F .  G K N  A V S  M L I N  L E S

ATTACTGAGA AAGTTAAAGA AATTTGAGAT CGAATATAAT GTAGAGCAGA     150
  Y . E  S . R  N L R S  N I M  . S R
I T E K  V K E  I . D  R I . C  R A E
 L L R  K L K K  F E I  E Y N  V E Q R

GGACCTTCAA AACACTGCAC CCTGGGGCCT CCTCAGCCAA TGGATGCCCT     200
G P S K  H C T  L G P  P Q P M  D A L
 D L Q  N T A P  W G L  L S Q  W M P W
  T F K  T L H  P G A S  S A N  G C P

GGACTCTCCC CTTCTTAGGA CCTCTAGCAG CTATAATATT TTTACTCCTC     250
 D S P  L L R T  S S S  Y N I  F T P L
  T L P  F L G  P L A A  I I F  L L L
G L S P  S . D  L . Q  L . Y F  Y S S

TTTGGACCCT GTATCTTCAA CTTCCTTGTT AAGTTTGTCT CTTCCAGAAT     300
  W T L  Y L Q  L P C .  V C L  F Q N
F G P C  I F N  F L V  K F V S  S R I
 L D P  V S S T  S L L  S L S  L P E L

TGAAGCTGTA AAGCTACAAA TAGTTCTTCA AATGGAACCC CAGATGCAGT     350
. S C K  A T N  S S S  N G T P  D A V
 E A V  K L Q I  V L Q  M E P  Q M Q S
  K L .  S Y K  . F F K  W N P  R C S
```

~~FIG 5~~ (continued)

FIG 5B

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
CCATGACTAA AATCTACCGT GGACCCCTGG ACCGGCCTGC TAGACTATGC  400
 H  D  .  N  L  P  W  T  P  G  P  A  C  .  T  M  L
  M  T  K  I  Y  R  G  P  L  D  R  P  A  R  L  C
P  .  L  K  S  T  V  D  P  W  T  G  L  L  D  Y  A

TCTGATGTTA ATGACATTGA AGTCACCCCT CCCGAGGAAA TCTCAACTGC  450
  .  C  .  .  H  .  S  H  P  S  R  G  N  L  N  C
S  D  V  N  D  I  E  V  T  P  P  E  E  I  S  T  A
 L  M  L  M  T  L  K  S  P  L  P  R  K  S  Q  L  H

ACAACCCCTA CTACACTCCA ATTCAGTAGG AAGCAGTTAG AGCAGTTGTC  500
T  T  P  T  T  L  Q  F  S  R  K  Q  L  E  Q  L  S
 Q  P  L  L  H  S  N  S  V  G  S  S  .  S  S  C  Q
  N  P  Y  Y  T  P  I  Q  .  E  A  V  R  A  V  V

AGCCAACCTC CCCAACAGTA CTTGGGTTTT CCTGTTGAGA GGGTGGACTG  550
 A  N  L  P  N  S  T  W  V  F  L  L  R  G  W  T  E
  P  T  S  P  T  V  L  G  F  S  C  .  E  G  G  L
S  Q  P  P  Q  Q  Y  L  G  F  P  V  E  R  V  D  .

AGAGACAGGA CTAGCTGGAT TTCCTAGGCT GACTAAGAAT CCCNAAGCCT  600
  R  Q  D  .  L  D  F  L  G  .  L  R  I  P  K  P
R  D  R  T  S  W  I  S  .  A  D  .  E  S  X  S  L
 E  T  G  L  A  G  F  P  R  L  T  K  N  P  X  A  X

ANCTGGGAAG GTGACCGCAT CCATCTTTAA ACATGGGGCT TGCAACTTAG  650
X  W  E  G  D  R  I  H  L  .  T  W  G  L  Q  L  S
 X  G  K  V  T  A  S  I  F  K  H  G  A  C  N  L  A
  L  G  R  .  P  H  P  S  L  N  M  G  L  A  T  .

CTCACACCCG ACCAATCAGA GAGCTCACTA AAATGCTAAT CAGGCAAAAA  700
 S  H  P  T  N  Q  R  A  H  .  N  A  N  Q  A  K  T
  H  T  R  P  I  R  E  L  T  K  M  L  I  R  Q  K
L  T  P  D  Q  S  E  S  S  L  K  C  .  S  G  K  N
```

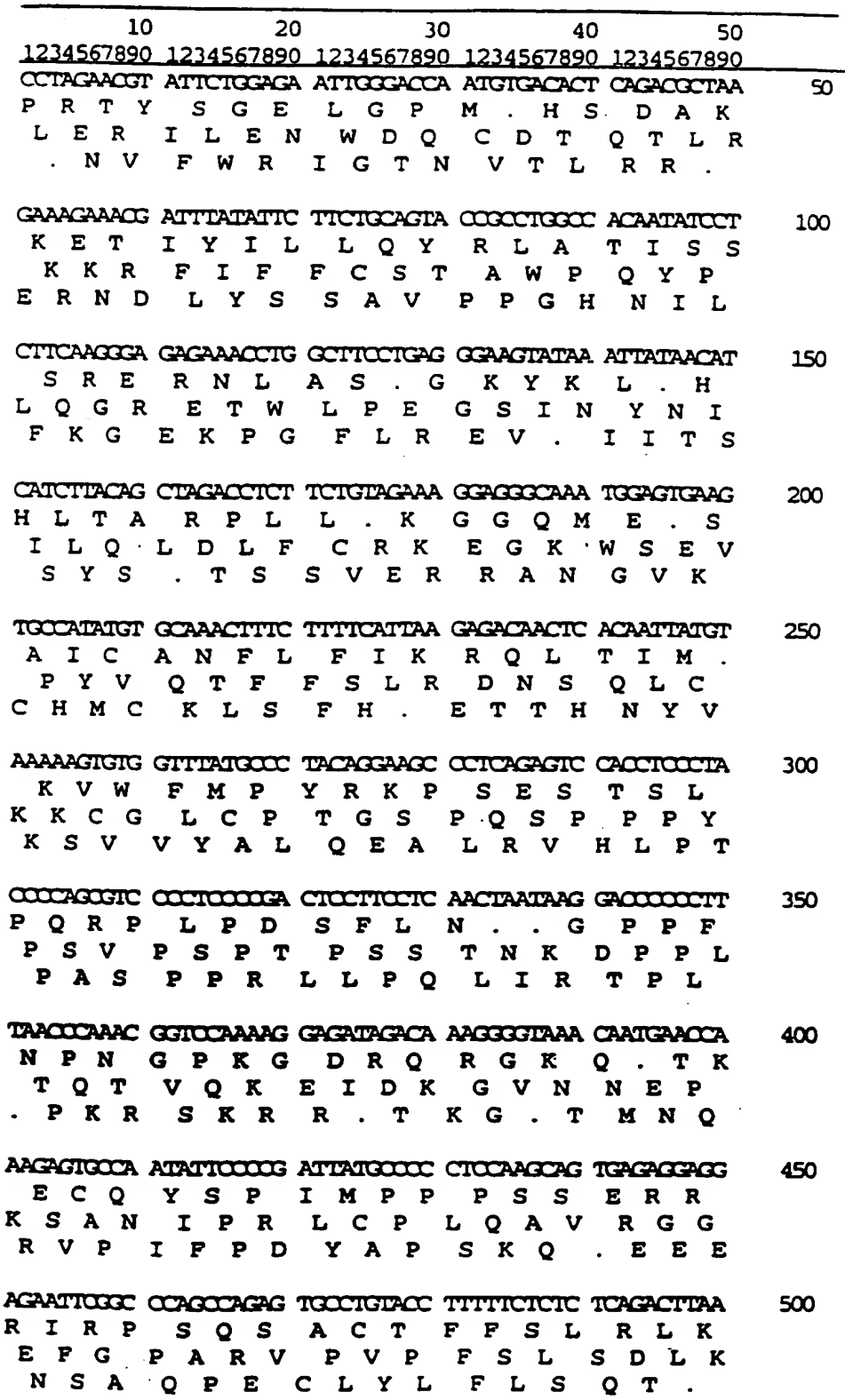
~~FIG 5 (continued)~~
FIG 5C

```
          10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
CAGGAGGTAA AGCAATAGCC AATCATCTAT TGCCTGAGAG CACAGCGGGA   750
  G G K   A I A   N H L L   P E S   T A G
Q E V K   Q . P   I I Y   C L R A   Q R E
 R R .   S N S Q   S S I   A . E   H S G K

AGGACAAGGA TTGGGATATA AACTCAGGCA TTCAAGCCAG CAACAGCAAC   800
R T R I   G I .   T Q A   F K P A   T A T
 G Q G   L G Y K   L R H   S S Q   Q Q Q P
  D K D   W D I   N S G I   Q A S   N S N

CCCCTTTGGG TCCCCTCCCA TTGTATGGGA GCTCTGTTTT CACTCTATTT   850
 P F G   S P P I   V W E   L C F   H S I S
  P L G   P L P   L Y G S   S V F   T L F
P L W V   P S H   C M G   A L F S   L Y F

CACTCTATTA AATCATGCAA CTGCACTCTT CTGGTCCGTG TTTTTTATGG   900
  L Y .   I M Q   L H S S   G P C   F L W
H S I K   S C N   C T L   L V R V   F Y G
 T L L   N H A T   A L F   W S V   F F M A

CTCAAGCTGA GCTTTTGTTC GCCATCCACC ACTGCTGTTT GCCACCGTCA   950
L K L S   F C S   P S T   T A V C   H R H
 S S .   A F V R   H P P   L L F   A T V T
  Q A E   L L F   A I H H   C C L   P P S

CAGACCCGCT GCTGACTTCC ATCCCTTTGG ATCCAGCAGA GTGTCCACTG  1000
 R P A   A D F H   P F G   S S R   V S T V
  D P L   L T S   I P L D   P A E   C P L
Q T R C   . L P   S L W   I Q Q S   V H C

TGCTCCTGAT CCAGCGAGGT ACCCATTGCC ACTCCCGATC AGGCTAAAGG  1050
  L L I   Q R G   T H C H   S R S   G . R
C S .   S S E V   P I A   T P D Q   A K G
 A P D   P A R Y   P L P   L P I   R L K A
```

~~FIG 5 (continued)~~
FIG 5D

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
CTTGCCATTG TTCCTGCATG GCTAAGTGCC TGGGTTTGTC CTAATAGAAC  1100
L A I V   P A W   L S A   W V C P   N R T
 L P L   F L H G   . V P   G F V   L I E L
  C H C   S C M   A K C L   G L S   . . N

TGAACACTGG TCACTGGGTT CCATGGTTCT CTTCCATGAC CCACGGCTTC  1150
 E H W   S L G S   M V L   F H D   P R L L
  N T G   H W V   P W F S   S M T   H G F
. T L V   T G F   H G S   L P .   P T A S

TAATAGAGCT ATAACACTCA CCGCATGGCC CAAGATTCCA TTCCTTGGTA  1200
  I E L   . H S   P H G P   R F H   S L V
. . S Y   N T H   R M A   Q D S I   P W Y
 N R A   I T L T   A W P   K I P   F L G I

TCTGTGAGGC CAAGAACCCC AGGTCAGAGA ANGTGAGGCT TGCCACCATT  1250
S V R P   R T P   G Q R   X . G L   P P F
 L . G   Q E P Q   V R E   X E A   C H H L
  C E A   K N P   R S E X   V R L   A T I

TGGGAAGTGG CCCACTGCCA TTTTGGTAGC GGCCCACCAC CATCTTGGGA  1300
 G K W   P T A I   L V A   A H H   H L G S
  G S G   P L P   F W .   R P T T   I L G
W E V A   H C H   F G S   G P P P   S W E

GCTGTGGGAG CAAGGATCCC CCAGTAACA                         1329
  C G S   K D P   P V T
A V G A   R I P   Q .
 L W E   Q G S P   S N
```

FIG 6A


10 20 30 40 50
1234567890 1234567890 1234567890 1234567890 1234567890
CCTAGAACGT ATTCTGGAGA ATTGGGACCA ATGTGACACT CAGACGCTAA 50
P R T Y S G E L G P M . H S D A K
L E R I L E N W D Q C D T Q T L R
. N V F W R I G T N V T L R R .
GAAAGAAACG ATTTATATTC TTCTGCAGTA CCGCCTGGCC ACAATATCCT 100
K E T I Y I L L Q Y R L A T I S S
K K R F I F F C S T A W P Q Y P
E R N D L Y S S A V P P G H N I L
CTTCAAGGGA GAGAAACCTG GCTTCCTGAG GGAAGTATAA ATTATAACAT 150
S R E R N L A S . G K Y K L . H
L Q G R E T W L P E G S I N Y N I
F K G E K P G F L R E V . I I T S
CATCTTACAG CTAGACCTCT TCTGTAGAAA GGAGGGCAAA TGGAGTGAAG 200
H L T A R P L L . K G G Q M E . S
I L Q L D L F C R K E G K W S E V
S Y S . T S S V E R R A N G V K
TGCCATATGT GCAAACTTTC TTTTCATTAA GAGACAACTC ACAATTATGT 250
A I C A N F L F I K R Q L T I M .
P Y V Q T F F S L R D N S Q L C
C H M C K L S F H . E T T H N Y V
AAAAAGTGTG GTTTATGCCC TACAGGAAGC CCTCAGAGTC CACCTCCCTA 300
K V W F M P Y R K P S E S T S L
K K C G L C P T G S P Q S P P P Y
K S V V Y A L Q E A L R V H L P T
CCCCAGCGTC CCCTCCCCGA CTCCTTCCTC AACTAATAAG GACCCCCCTT 350
P Q R P L P D S F L N . . G P P F
P S V P S P T P S S T N K D P P L
P A S P P R L L P Q L I R T P L
TAACCCAAAC GGTCCAAAAG GAGATAGACA AAGGGGTAAA CAATGAACCA 400
N P N G P K G D R Q R G K Q . T K
T Q T V Q K E I D K G V N N E P
. P K R S K R R . T K G . T M N Q
AAGAGTGCCA ATATTCCCCG ATTATGCCCC CTCCAAGCAG TGAGAGGAGG 450
E C Q Y S P I M P P P S S E R R
K S A N I P R L C P L Q A V R G G
R V P I F P D Y A P S K Q . E E E
AGAATTCGGC CCAGCCAGAG TGCCTGTACC TTTTTCTCTC TCAGACTTAA 500
R I R P S Q S A C T F F S L R L K
E F G P A R V P V P F S L S D L K
N S A Q P E C L Y L F L S Q T .

~~FIG 6 (continued)~~

FIG 6B

```
          10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
AGCAAATTAA AATAGACCTA GGTAAATTCT CAGATAACCC TGACGGCTAT   550
 A N . N R P R . I L R . P . R L Y
  Q I K I D L G K F S D N P D G Y
S K L K . T . V N S Q I T L T A I

ATTGATGTTT TACAAGGGTT AGGACAATCC TTTGATCTGA CATGGAGAGA   600
  . C F T R V R T I L . S D M E R
I D V L Q G L G Q S F D L T W R D
 L M F Y K G . D N P L I . H G E I

TATAATGTTA CTACTAAATC AGACACTAAC CCCAAATGAG AGAAGTGCCG   650
Y N V T T K S D T N P K . E K C R
 I M L L L N Q T L T P N E R S A A
  . C Y Y . I R H . P Q M R E V P

CTGTAACTGC AGCCCGAGAG TTTGGCGATC TTTGGTATCT CAGTCAGGCC   700
 C N C S P R V W R S L V S Q S G Q
  V T A A R E F G D L W Y L S Q A
L . L Q P E S L A I F G I S V R P

AACAATAGGA TGACAACAGA GGAAAGAACA ACTCCCACAG GCCAGCAGGC   750
  Q . D D N R G K N N S H R P A G
N N R M T T E E R T T P T G Q Q A
 T I G . Q Q R K E Q L P Q A S R Q

AGTTCCCAGT GTAGACCCTC ATTGGGACAC AGAATCAGAA CATGGAGATT   800
S S Q C R P S L G H R I R T W R L
 V P S V D P H W D T E S E H G D W
  F P V . T L I G T Q N Q N M E I

GGTGCCACAA ACATTTGCTA ACTTGCGTGC TAGAAGGACT GAGGAAAACT   850
 V P Q T F A N L R A R R T E E N .
  C H K H L L T C V L E G L R K T
G A T N I C . L A C . K D . G K L

AGGAAGAAGC CTATGAATTA CTCAATGATG TCCACTATAA CACAGGGAAA   900
  E E A Y E L L N D V H Y N T G K
R K K P M N Y S M M S T I T Q G K
 G R S L . I T Q . C P L . H R E R

GGAAGAAAAT CTTACTGCTT TTCTGGACAG ACTAAGGGAG GCATTGAGGA   950
G R K S Y C F S G Q T K G G I E E
 E E N L T A F L D R L R E A L R K
  K K I L L L F W T D . G R H . G

AGCATACCTC CCTGTCACCT GACTCTATTG AAGGCCAACT AATCTTAAAG  1000
 A Y L P V T . L Y . R P T N L K G
  H T S L S P D S I E G Q L I L K
S I P P C H L T L L K A N . S . R
```

~~FIG 6 (continued)~~

FIG 6C

```
          10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
GATAAGTTTA TCACTCAGTC AGCTGCAGAC ATTAGAAAAA ACTTCAAAAG  1050
  . V Y  H S V  S C R H  . K K  L Q K
D K F I  T Q S  A A D  I R K N  F K S
 I S L  S L S Q  L Q T  L E K  T S K V

TCTGCCTTAG GCCCGGAGCA GAACTTAGAA ACCCTATTTA ACTTGGCATC  1100
S A L G  P E Q  N L E  T L F N  L A S
 L P .  A R S R  T . K  P Y L  T W H P
  C L R  P G A  E L R N  P I .  L G I

CTCAGTTTTT TATAATAGAG ATCAGGAGGA GCAGGCGAAA CGGGACAAAC  1150
 S V F  Y N R D  Q E E  Q A K  R D K R
  Q F F  I I E  I R R S  R R N  G T N
L S F L  . . R  S G G  A G E T  G Q T

GGGATAAAAA AAAAAGGGGG GGTCCACTAC TTTAGTCATG GCCCTCAGGC  1200
  D K K  K R G  G P L L  . S W  P S G
G I K K  K G G  V H Y  F S H G  P Q A
 G . K  K K G G  S T T  L V M  A L R Q

AAGCAGACTT TGGAGGCTCT GCAAAAGGGA AAAGCTGGGC AAATCAAATG  1250
K Q T L  E A L  Q K G  K A G Q  I K C
 S R L  W R L C  K R E  K L G  K S N A
  A D F  G G S  A K G K  S W A  N Q M

CCTAATAGGG CTGGCTTCCA GTGCGGTCTA CAAGGACACT TTAAAAAAGA  1300
 L I G  L A S S  A V Y  K D T  L K K I
  . . G  W L P  V R S T  R T L  . K R
P N R A  G F Q  C G L  Q G H F  K K D

TTATCCAAGT AGAAATAAGC CGCCCCCTTG TCCATGCCCC TTACGTCAAG  1350
  I Q V  E I S  R P L V  H A P  Y V K
L S K .  K . A  A P L  S M P L  T S R
 Y P S  R N K P  P P C  P C P  L R Q G

GGAATCACTG GAAGCCCCAC TGCCCCAGGG GATGAAGATA CTCTGAGTCA  1400
G I T G  R P T  A P G  D E D T  L S Q
 E S L  E G P L  P Q G  M K I  L . V R
  N H W  K A H  C P R G  . R Y  S E S

GAAGCCATTA ACCAGATGAT CCAGCAGCAG GACTGAGGGT GCCCGGGGCG  1450
 K P L  T R .  S S S R  T E G  A R G E
  S H .  P D D  P A A G  L R V  P G A
E A I N  Q M I  Q Q Q  D . G  C P G R

AGCGCCAGCC CATGCCATCA CCCTCACAGA GCCCCGGGTA TGTTTGACCA  1500
  R Q P  M P S  P S Q S  P G Y  V . P
S A S P  C H H  P H R  A P G M  F D H
 A P A  H A I T  L T E  P R V  C L T I
```

~~FIG 6 (continued)~~

FIG 6D

```
          10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
TTGAGAGCCA A                                          1511
L  R  A
   E  P
E  S  Q
```

FIG 7A

```
          10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
ATGGGCAGCA GCCATCATCA TCATCATCAC AGCAGCGGCC TGGTGCCGCG      50
M  G  S  S  H  H  H  H  H  H  S  S  G  L  V  P  R

CGGCAGCCAT ATGGCTAGCA TGACTGGTGG ACAGCAAATG GGTCGGATCC     100
G  S  H  M  A  S  M  T  G  G  Q  Q  M  G  R  I  L

TAGAACGTAT TCTGGAGAAT TGGGACCAAT GTGACACTCA GACGCTAAGA     150
E  R  I  L  E  N  W  D  Q  C  D  T  Q  T  L  R

AAGAAACGAT TTATATTCTT CTGCAGTACC GCCTGGCCAC AATATCCTCT     200
K  K  R  F  I  F  F  C  S  T  A  W  P  Q  Y  P  L

TCAAGGGAGA GAAACCTGGC TTCCTGAGGG AAGTATAAAT TATAACATCA     250
Q  G  R  E  T  W  L  P  E  G  S  I  N  Y  N  I  I

TCTTACAGCT AGACCTCTTC TGTAGAAAGG AGGGCAAATG GAGTGAAGTG     300
L  Q  L  D  L  F  C  R  K  E  G  K  W  S  E  V

CCATATGTGC AAACTTTCTT TTCATTAAGA GACAACTCAC AATTATGTAA     350
P  Y  V  Q  T  F  F  S  L  R  D  N  S  Q  L  C  K

AAAGTGTGGT TTATGCCCTA CAGGAAGCCC TCAGAGTCCA CCTCCCTACC     400
K  C  G  L  C  P  T  G  S  P  Q  S  P  P  P  Y  P

CCAGCGTCCC CTCCCCGACT CCTTCCTCAA CTAATAAGGA CCCCCCTTTA     450
S  V  P  S  P  T  P  S  S  T  N  K  D  P  P  L

ACCCAAACGG TCCAAAAGGA GATAGACAAA GGGGTAAACA ATGAACCAAA     500
T  Q  T  V  Q  K  E  I  D  K  G  V  N  N  E  P  K

GAGTGCCAAT ATTCCCCGAT TATGCCCCCT CCAAGCAGTG AGAGGAGGAG     550
S  A  N  I  P  R  L  C  P  L  Q  A  V  R  G  G  E

AATTCGGCCC AGCCAGAGTG CCTGTACCTT TTTCTCTCTC AGACTTAAAG     600
F  G  P  A  R  V  P  V  P  F  S  L  S  D  L  K

CAAATTAAAA TAGACCTAGG TAAATTCTCA GATAACCCTG ACGGCTATAT     650
Q  I  K  I  D  L  G  K  F  S  D  N  P  D  G  Y  I

TGATGTTTTA CAAGGGTTAG GACAATCCTT TGATCTGACA TGGAGAGATA     700
D  V  L  Q  G  L  G  Q  S  F  D  L  T  W  R  D  I

TAATGTTACT ACTAAATCAG ACACTAACCC CAAATGAGAG AAGTGCCGCT     750
M  L  L  L  N  Q  T  L  T  P  N  E  R  S  A  A

GTAACTGCAG CCCGAGAGTT TGGCGATCTT TGGTATCTCA GTCAGGCCAA     800
V  T  A  A  R  E  F  G  D  L  W  Y  L  S  Q  A  N
```

~~FIG 7 (continued)~~
FIG 7B

```
          10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
CAATAGGATG ACAACAGAGG AAAGAACAAC TCCCACAGGC CAGCAGGCAG      850
 N  R  M   T  T  E  E   R  T  T   P  T  G   Q  Q  A  V

TTCCCAGTGT AGACCCTCAT TGGGACACAG AATCAGAACA TGGAGATTGG      900
 P  S  V   D  P  H  W   D  T  E   S  E  H   G  D  W

TGCCACAAAC ATTTGCTAAC TTGCGTGCTA GAAGGACTGA GGAAAACTAG      950
 C  H  K   H  L  L  T   C  V  L   E  G  L   R  K  T  R

GAAGAAGCCT ATGAATTACT CAATGATGTC CACTATAACA CAGGGAAAGG      1000
 K  K  P   M  N  Y  S   M  M  S   T  I  T   Q  G  K  E

AAGAAAATCT TACTGCTTTT CTGGACAGAC TAAGGGAGGC ATTGAGGAAG      1050
 E  N  L   T  A  F  L   D  R  L   R  E  A   L  R  K

CATACCTCCC TGTCACCTGA CTCTATTGAA GGCCAACTAA TCTTAAAGGA      1100
 H  T  S   L  S  P  D   S  I  E   G  Q  L   I  L  K  D

TAAGTTTATC ACTCAGTCAG CTGCAGACAT TAGAAAAAAC TTCAAAAGTC      1150
 K  F  I   T  Q  S  A   A  D  I   R  K  N   F  K  S  L

TGCCTAAGCT TGCGGCCGCA CTCGAGCACC ACCACCACCA CCACTGAGAT      1200
 P  K  L   A  A  A  L   E  H  H   H  H  H   H  .  D

CCGGCTGCTA ACAAAGCCCG AAAGGAAGCT GAGTTGGCTN GTGGCNA         1247
 P  A  A   N  K  A  R   K  E  A   E  L  A   X  G
```

FIG 8A

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
ATGGCTAGCA TGACTGGTGG ACAGCAAATG GGTCGGATCC TAGAACGTAT    50
M  A  S  M  T  G  G  Q  Q  M  G  R  I  L  E  R  I

TCTGGAGAAT TGGGACCAAT GTGACACTCA GACGCTAAGA AAGAAACGAT   100
 L  E  N  W  D  Q  C  D  T  Q  T  L  R  K  K  R  F

TTATATTCTT CTGCAGTACC GCCTGGCCAC AATATCCTCT TCAAGGGAGA   150
 I  F  F  C  S  T  A  W  P  Q  Y  P  L  Q  G  R

GAAACCTGGC TTCCTGAGGG AAGTATAAAT TATAACATCA TCTTACAGCT   200
E  T  W  L  P  E  G  S  I  N  Y  N  I  I  L  Q  L

AGACCTCTTC TGTAGAAAGG AGGGCAAATG GAGTGAAGTG CCATATGTGC   250
 D  L  F  C  R  K  E  G  K  W  S  E  V  P  Y  V  Q

AAACTTTCTT TTCATTAAGA GACAACTCAC AATTATGTAA AAAGTGTGGT   300
  T  F  F  S  L  R  D  N  S  Q  L  C  K  K  C  G

TTATGCCCTA CAGGAAGCCC TCAGAGTCCA CCTCCCTACC CCAGCGTCCC   350
L  C  P  T  G  S  P  Q  S  P  P  P  Y  P  S  V  P

CTCCCCGACT CCTTCCTCAA CTAATAAGGA CCCCCCTTTA ACCCAAACGG   400
 S  P  T  P  S  S  T  N  K  D  P  P  L  T  Q  T  V

TCCAAAAGGA GATAGACAAA GGGGTAAACA ATGAACCAAA GAGTGCCAAT   450
  Q  K  E  I  D  K  G  V  N  N  E  P  K  S  A  N

ATTCCCCGAT TATGCCCCCT CCAAGCAGTG AGAGGAGGAG AATTCGGCCC   500
I  P  R  L  C  P  L  Q  A  V  R  G  G  E  F  G  P

AGCCAGAGTG CCTGTACCTT TTTCTCTCTC AGACTTAAAG CAAATTAAAA   550
 A  R  V  P  V  P  F  S  L  S  D  L  K  Q  I  K  I

TAGACCTAGG TAAATTCTCA GATAACCCTG ACGGCTATAT TGATGTTTTA   600
  D  L  G  K  F  S  D  N  P  D  G  Y  I  D  V  L

CAAGGGTTAG GACAATCCTT TGATCTGACA TGGAGAGATA TAATGTTACT   650
Q  G  L  G  Q  S  F  D  L  T  W  R  D  I  M  L  L

ACTAAATCAG ACACTAACCC CAAATGAGAG AAGTGCCGCT GTAACTGCAG   700
 L  N  Q  T  L  T  P  N  E  R  S  A  A  V  T  A  A

CCCGAGAGTT TGGCGATCTT TGGTATCTCA GTCAGGCCAA CAATAGGATG   750
  R  E  F  G  D  L  W  Y  L  S  Q  A  N  N  R  M

ACAACAGAGG AAAGAACAAC TCCCACAGGC CAGCAGGCAG TTCCCAGTGT   800
T  T  E  E  R  T  T  P  T  G  Q  Q  A  V  P  S  V
```

~~FIG 8 (continued)~~

FIG 8B

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
AGACCCTCAT TGGGACACAG AATCAGAACA TGGAGATTGG TGCCACAAAC   850
 D  P  H   W  D  T  E   S  E  H   G  D  W   C  H  K  H

ATTTGCTAAC TTGCGTGCTA GAAGGACTGA GGAAAACTAG GAAGAAGCCT   900
  L  L  T   C  V  L   E  G  L  R   K  T  R   K  K  P

ATGAATTACT CAATGATGTC CACTATAACA CAGGGAAAGG AAGAAAATCT   950
M  N  Y  S   M  M  S   T  I  T   Q  G  K  E   E  N  L

TACTGCTTTT CTGGACAGAC TAAGGGAGGC ATTGAGGAAG CATACCTCCC  1000
 T  A  F   L  D  R  L   R  E  A   L  R  K   H  T  S  L

TGTCACCTGA CTCTATTGAA GGCCAACTAA TCTTAAAGGA TAAGTTTATC  1050
  S  P  D   S  I  E   G  Q  L  I   L  K  D   K  F  I

ACTCAGTCAG CTGCAGACAT TAGAAAAAAC TTCAAAAGTC TGCCTAAGCT  1100
T  Q  S  A   A  D  I   R  K  N   F  K  S  L   P  K  L

TGCGGCCGCA CTCGAGCACC ACCACCACCA CCACTGAGAT CCGGCTGCTA  1150
 A  A  A   L  E  H  H   H  H  H   H  .  D   P  A  A  N

ACAAAGCCCG AAAGGAAGCT GAGTTGGCTG GTGGCA                 1186
  K  A  R   K  E  A   E  L  A  G   G
```

FIG 9A

```
      10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
TGTCCGCTGT GCTCCTGATC CAGCACAGGC GCCCATTGCC TCTCCCAATT   50
C P L C  S . S  S T G  A H C L  S Q L
 V R C  A P D P  A Q A  P I A  S P N W
  S A V  L L I  Q H R R  P L P  L P I

GGGCTAAAGG CTTGCCATTG TTCCTGCACA GCTAAGTGCC TGGGTTCATC   100
 G . R  L A I V  P A Q  L S A  W V H P
  A K G  L P L  F L H S  . V P  G F I
G L K A  C H C  S C T  A K C L  G S S

CTAATCGAGC TGAACACTAG TCACTGGGTT CCACGGTTCT CTTCCATGAC   150
  N R A  E H .  S L G S  T V L  F H D
L I E L  N T S  H W V  P R F S  S M T
 . S S  . T L V  T G F  H G S  L P . P

CCATGGCTTC TAATAGAGCT ATAACACTCA CTGCATGGTC CAAGATTCCA   200
P W L L  I E L  . H S  L H G P  R F H
 H G F  . . S Y  N T H  C M V  Q D S I
  M A S  N R A  I T L T  A W S  K I P

TTCCTTGGAA TCCGTGAGAC CAAGAACCCC AGGTCAGAGA ACACAAGGCT   250
 S L E  S V R P  R T P  G Q R  T Q G L
  P W N  P . D  Q E P Q  V R E  H K A
F L G I  R E T  K N P  R S E N  T R L

TGCCACCATG TTGGAAGCAG CCCACCACCA TTTTGGAAGC AGCCCGCCAC   300
  P P C  W K Q  P T T I  L E A  A R H
C H H V  G S S  P P P  F W K Q  P A T
 A T M  L E A A  H H H  F G S  S P P L

TATCTTGGGA GCTCTGGGAG CAAGGACCCC AGGTAACAAT TTGGTGACCA   350
Y L G S  S G S  K D P  R . Q F  G D H
 I L G  A L G A  R T P  G N N  L V T T
  S W E  L W E  Q G P Q  V T I  W . P

CGAAGGGACC TGAATCCGCA ACCATGAAGG GATCTCCAAA GCAATTGGAA   400
 E G T  . I R N  H E G  I S K  A I G N
  K G P  E S A  T M K G  S P K  Q L E
R R D L  N P Q  P . R  D L Q S  N W K
```

~~FIG 9 (continued)~~

FIG 9B

```
          10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
ATGTTCCTCC CAAGGCAAAA ATGCCCCTAA GATGTATTCT GGAGAATTGG     450
  V  P  P   K  A  K   M  P  L  R   C  I  L   E  N  W
M  F  L  P   R  Q  K   C  P  .  D   V  F  W   R  I  G
 C  S  S   Q  G  K  N   A  P  K   M  Y  S   G  E  L  G

GACCAATTTG ACCCTCAGAC AGTAAGAAAA AAATGACTTA TATTCTTCTG     500
D  Q  F  D   P  Q  T   V  R  K   K  .  L  I   F  F  C
 T  N  L   T  L  R  Q   .  E  K   N  D  L   Y  S  S  A
  P  I  .   P  S  D   S  K  K  K   M  T  Y   I  L  L

CAGTACCGCC CTGGCCACGA TATCCTCTTC AAGGGGGAGA AACCTGGCCT     550
 S  T  A   L  A  T  I   S  S  S   R  G  R   N  L  A  S
  V  P  P   W  P  R   Y  P  L  Q   G  G  E   T  W  P
Q  Y  R  P   G  H  D   I  L  F   K  G  E  K   P  G  L

CCTGAGGGAA GTATAAATTA TAACACCATC TTACAGCTAG ACCTGTTTTG     600
  .  G  K   Y  K  L   .  H  H  L   T  A  R   P  V  L
P  E  G  S   I  N  Y   N  T  I   L  Q  L  D   L  F  C
 L  R  E   V  .  I  I   T  P  S   Y  S  .   T  C  F  V

TAGAAAAGGA GGCAAATGGA GTGAAGTGCC ATATTTACAA ACTTTCTTTT     650
.  K  R  R   Q  M  E   .  S  A   I  F  T  N   F  L  F
 R  K  G   G  K  W  S   E  V  P   Y  L  Q   T  F  F  S
  E  K  E   A  N  G   V  K  C  H   I  Y  K   L  S  F

CATTAAAAGA CAACTCGCAA TTATGTTAAC AGTGTGATTT GTGTTCCTAC     700
 I  K  R   Q  L  A  I   M  L  T   V  .  F   V  F  L  H
  L  K  D   N  S  Q   L  C  .  Q   C  D  L   C  S  Y
H  .  K  T   T  R  N   Y  V  N   S  V  I  C   V  P  T

ACGGAAGCCC TCAGATTCTA CTCCCCACCC CCGGCATCTC CCCTGAATCC     750
  G  S  P   Q  I  L   L  P  T  P   G  I  S   P  E  S
T  E  A  L   R  F  Y   S  P  P   P  A  S  P   L  N  P
 R  K  P   S  D  S  T   P  H  P   R  H  L   P  .  I  P

CTCCCCAACT TATT                                           764
L  P  N  L
 S  P  T  Y
  P  Q  L  I
```

FIG 10A

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
TGTCCGCTGT GCTCCTGATC CAGCACAGGC GCCCATTGCC TCTCCCAATT   50
C P L C  S . S  S T G  A H C L  S Q L
 V R C  A P D P  A Q A  P I A  S P N W
  S A V  L L I  Q H R R  P L P  L P I

GGGCTAAAGG CTTGCCATTG TTCCTGCACA GCTAAGTGCC TGGGTTCATC  100
 G . R  L A I V  P A Q  L S A  W V H P
  A K G  L P L  F L H S  . V P  G F I
G L K A  C H C  S C T  A K C L  G S S

CTAATCGAGC TGAACACTAG TCACTGGGTT CCACGGTTCT CTTCCATGAC  150
  N R A  E H .  S L G S  T V L  F H D
L I E L  N T S  H W V  P R F S  S M T
 . S S  . T L V  T G F  H G S  L P . P

CCATGGCTTC TAATAGAGCT ATAACACTCA CTGCATGGTC CAAGATTCCA  200
P W L L  I E L  . H S  L H G P  R F H
 H G F  . . S Y  N T H  C M V  Q D S I
  M A S  N R A  I T L T  A W S  K I P

TTCCTTGGAA TCCGTGAGAC CAAGAACCCC AGGTCAGAGA ACACAAGGCT  250
 S L E  S V R P  R T P  G Q R  T Q G L
  P W N  P . D  Q E P Q  V R E  H K A
F L G I  R E T  K N P  R S E N  T R L

TGCCACCATG TTGGAAGCAG CCCACCACCA TTTTGGAAGC GGCCCGCCAC  300
  P P C  W K Q  P T T I  L E A  A R H
C H H V  G S S  P P P  F W K R  P A T
 A T M  L E A A  H H H  F G S  G P P L

TATCTTGGGA GCTCTGGGAG CAAGGACCCC CAGGTAACAA TTTGGTGACC  350
Y L G S  S G S  K D P  Q V T I  W . P
 I L G  A L G A  R T P  R . Q  F G D H
  S W E  L W E  Q G P P  G N N  L V T

ACGAAGGGAC CTGAATCCGC AACCATGAAG GGATCTCCAA AGCAATTGGA  400
 R R D  L N P Q  P . R  D L Q  S N W K
  E G T  . I R  N H E G  I S K  A I G
T K G P  E S A  T M K  G S P K  Q L E
```

~~FIG 10 (continued)~~

FIG 10B

```
          10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
AATGTTCCTC CCAAGGCAAA AATGCCCCTA AGATGTATTC TGGAGAATTG   450
  C  S  S  Q  G  K  N  A  P  K  M  Y  S  G  E  L
N  V  P  P  K  A  K  M  P  L  R  C  I  L  E  N  W
 M  F  L  P  R  Q  K  C  P  .  D  V  F  W  R  I  G

GGACCAATCT GACCCTCAGA CAGTAAGAAA AAAAATGACT TATATTCTTC   500
G  P  I  .  P  S  D  S  K  K  K  N  D  L  Y  S  S
 D  Q  S  D  P  Q  T  V  R  K  K  M  T  Y  I  L  L
  T  N  L  T  L  R  Q  .  E  K  K  .  L  I  F  F

TGCAGTACCG CCTGGCCACG GATATCCTCT TCAAGGGGGA GAAACCTGGC   550
 A  V  P  P  G  H  G  Y  P  L  Q  G  G  E  T  W  P
  Q  Y  R  L  A  T  D  I  L  F  K  G  E  K  P  G
C  S  T  A  W  P  R  I  S  S  S  R  G  R  N  L  A

CTCCTGAGGG AAGTATAAAT TATAACACCA TCTTACAGCT AGACCTGTTT   600
  P  E  G  S  I  N  Y  N  T  I  L  Q  L  D  L  F
L  L  R  E  V  .  I  I  T  P  S  Y  S  .  T  C  F
 S  .  G  K  Y  K  L  .  H  H  L  T  A  R  P  V  L

TGTAGAAAAG GAGGCAAATG GAGTGAAGTG CCATATTTAC AAACTTTCTT   650
C  R  K  G  G  K  W  S  E  V  P  Y  L  Q  T  F  F
 V  E  K  E  A  N  G  V  K  C  H  I  Y  K  L  S  F
  .  K  R  R  Q  M  E  .  S  A  I  F  T  N  F  L

TTCATTAAAA GACAACTCGC AATTATGTAA ACAGTGTGAT TTGTGTCCTA   700
 S  L  K  D  N  S  Q  L  C  K  Q  C  D  L  C  P  T
  H  .  K  T  T  R  N  Y  V  N  S  V  I  C  V  L
F  I  K  R  Q  L  A  I  M  .  T  V  .  F  V  S  Y

CAGGAAGCCC TCAGATCTAC CTCCCTACCC CGGCATCTCC CTGACTCCTT   750
  G  S  P  Q  I  Y  L  P  T  P  A  S  P  .  L  L
Q  E  A  L  R  S  T  S  L  P  R  H  L  P  D  S  F
 R  K  P  S  D  L  P  P  Y  P  G  I  S  L  T  P  S

CCCCAACTAA TAAGGACCCA CTTCAGCCCA AACAGTCCAA AAGGACATAG   800
P  Q  L  I  R  T  H  F  S  P  N  S  P  K  G  H
 P  N  .  _.  G  P  T  S  A  Q  T  V  Q  K  D  I
  P  T  N  K  D  P  L  Q  P  K  Q  S  K  R  T  .
```

FIG 11A

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
GGCATTGATA GCACCCATCA GATGGCCAAA TCATTATTTA CTGGACCAGG      50
G I D S   T H Q   M A K   S L F T   G P G
 A L I   A P I R   W P N   H Y L   L D Q A
  H . .   H P S   D G Q   I I Y   W T R

CCTTTTCAAA ACTATCAAGC AGATAGGGCC CGTGAAGCAT GCCAAAGAAA     100
 L F K   T I K Q   I G P   V K H   A K E I
  F S K   L S S   R . G   P . S   M P K K
P F Q N   Y Q A   D R A   R E A   C Q R N

TAATCCCCTG CCTTATCGCC ATGTTCCTTC AGGAGAACAA AGAACAGGCC     150
  I P C   L I A   M F L   Q E N   K E Q A
. S P A   L S P   C S F   R R T   K N R P
 N P L   P Y R H   V P S   G E Q   R T G H

ATTACCCAGG GGAAGACTGG CAACTAGATT TTACCCACAT GGCCAAATGT     200
I T Q G   K T G   N . I   L P T W   P N V
 L P R   G R L A   T R F   Y P H   G Q M S
  Y P G   E D W   Q L D F   T H M   A K C

CAGGGATTTC AGCATCTACT AGTCTGGGCA GATACTTTCA CTGGTTGGGT     250
 R D F   S I Y .   S G Q   I L S   L V G W
  G I S   A S T   S L G R   Y F H   W L G
Q G F Q   H L L   V W A   D T F T   G W V

GGAGTCTTCT CCTTGTAGGA CAGAAAAGAC CCAAGAGGTA ATAAAGGCAC     300
  S L L   L V G   Q K R P   K R .   . R H
G V F S   L . D   R K D   P R G N   K G T
 E S S   P C R T   E K T   Q E V   I K A L

TAATGAAATA ATTCCCAGAT TTGGACTTCC CCCAGGATTA CAGGGTGACA     350
. . N N   S Q I   W T S   P R I T   G . Q
 N E I   I P R F   G L P   P G L   Q G D N
  M K .   F P D   L D F P   Q D Y   R V T
```

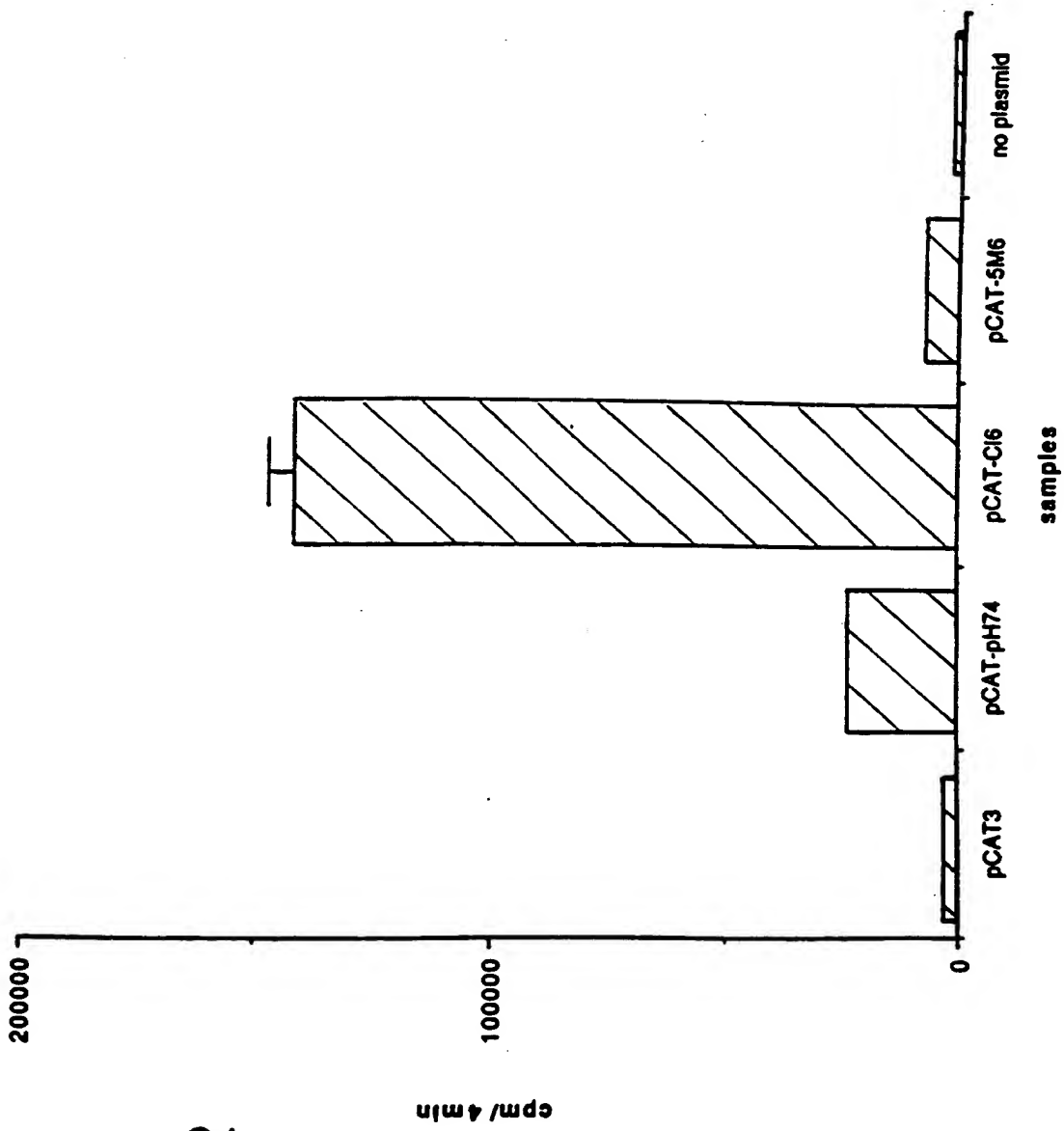
~~FIG 11 (continued)~~
FIG 11B

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
ATGGCCCCGC TTTCAAGGCT GCAGTAACCC AGGGAGTATC CCAGGTGTTA    400
 W  P  R  F  Q  G  C  S  N  P  G  S  I  P  G  V  R
  G  P  A  F  K  A  A  V  T  Q  G  V  S  Q  V  L
M  A  P  L  S  R  L  Q  .  P  R  E  Y  P  R  C  .

GGCATACAAT ATCACTTACA CTGTGCCTGG AGGCCACAAT CCTCCAGAAA    450
  H  T  I  S  L  T  L  C  L  E  A  T  I  L  Q  K
G  I  Q  Y  H  L  H  C  A  W  R  P  Q  S  S  R  K
 A  Y  N  I  T  Y  T  V  P  G  G  H  N  P  P  E  K

AGTCAAGAAA ATGAATGAAA CACTCAAAGA TCTAAAAAAG CTAACCCAAG    500
S  Q  E  N  E  .  N  T  Q  R  S  K  K  A  N  P  R
 V  K  K  M  N  E  T  L  K  D  L  K  K  L  T  Q  E
  S  R  K  .  M  K  H  S  K  I  .  K  S  .  P  K

AAACCCACAT TGCATGACCT GTTCTGTTGC CTATAACCTT ACTAAGAATC    550
 N  P  H  C  M  T  C  S  V  A  Y  N  L  T  K  N  P
  T  H  I  A  .  P  V  L  L  P  I  T  L  L  R  I
K  P  T  L  H  D  L  F  C  C  L  .  P  Y  .  E  S

CATAACTATC CCCCAAAAAG CAGGACTTAG CCCATACGAG ATGCTATATG    600
  .  L  S  P  K  K  Q  D  L  A  H  T  R  C  Y  M
H  N  Y  P  P  K  S  R  T  .  P  I  R  D  A  I  W
 I  T  I  P  Q  K  A  G  L  S  P  Y  E  M  L  Y  G

GATGGCCTTT CCTAACCAAT GACCTTGTGC TTGACTGAGA AATGGCCAAC    650
D  G  L  S  .  P  M  T  L  C  L  T  E  K  W  P  T
 M  A  F  P  N  Q  .  P  C  A  .  L  R  N  G  Q  L
  W  P  F  L  T  N  D  L  V  L  D  .  E  M  A  N

TTAGTTGCAG ACATCACCTC CTTAGCCAAA TATCAACAAG TTCTTAAAAC    700
  .  L  Q  T  S  P  P  .  P  N  I  N  K  F  L  K  H
 S  C  R  H  H  L  L  S  Q  I  S  T  S  S  .  N
L  V  A  D  I  T  S  L  A  K  Y  Q  Q  V  L  K  T
```

~~FIG 11 (continued)~~

FIG 11C

```
        10         20         30         40         50
1234567890 1234567890 1234567890 1234567890 1234567890
ATCACAGGGA ACCTGTCCCC GAGAGGAGGG AAAGGAACTA TTCCACCCTG     750
  H R E   P V P   E R R E   R N Y   S T L
I T G N   L S P   R G G   K G T I   P P W
 S Q G   T C P R   E E G   K E L   F H P G

GTGACATG                                                  758
V T
 . H
  D M
```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100000
0
cpm/ 4min
pCAT3
pCAT-pH74
pCAT-Ci6
pCAT-5M6
no plasmid
samples

FIG 12

FIG13

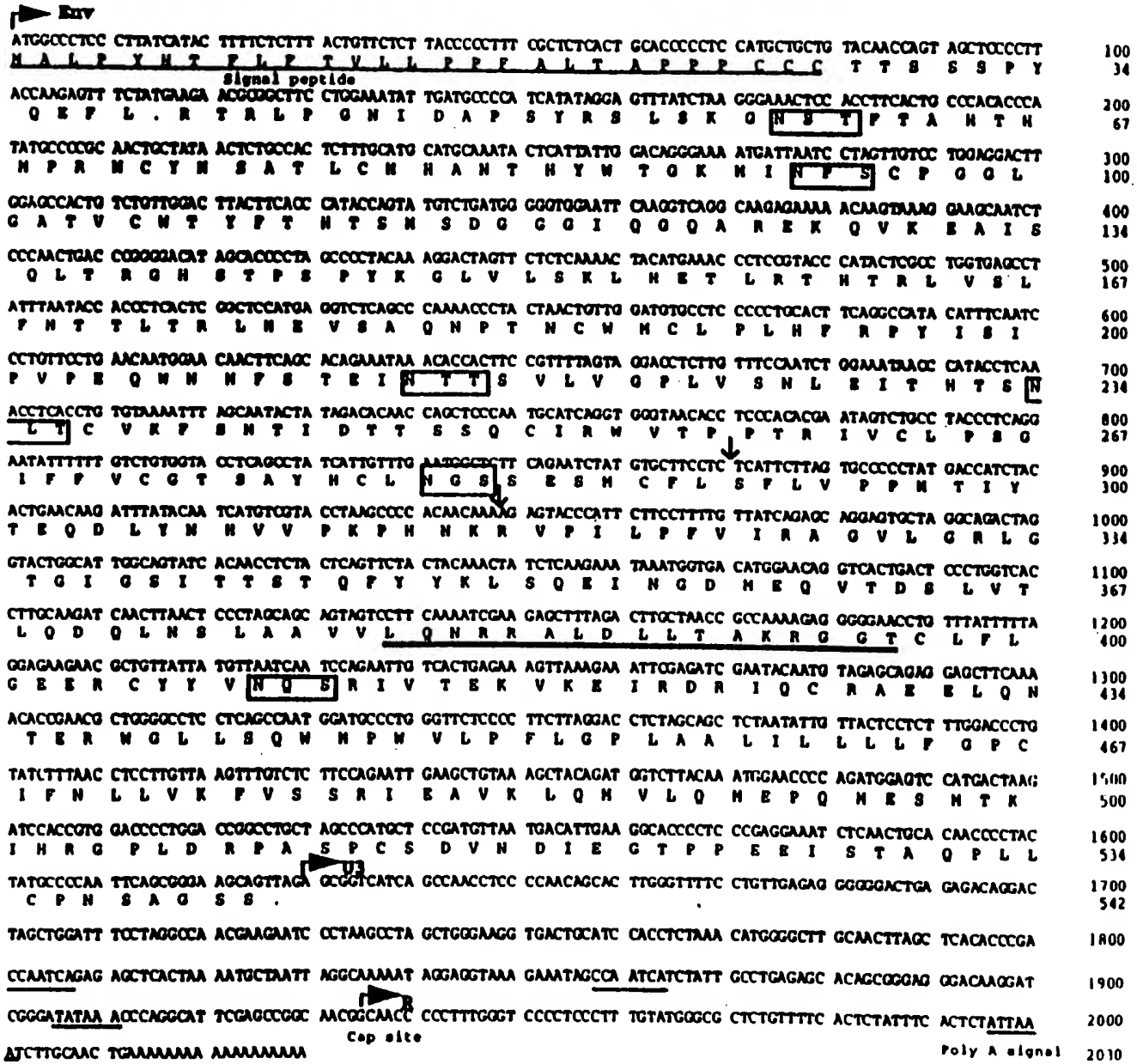
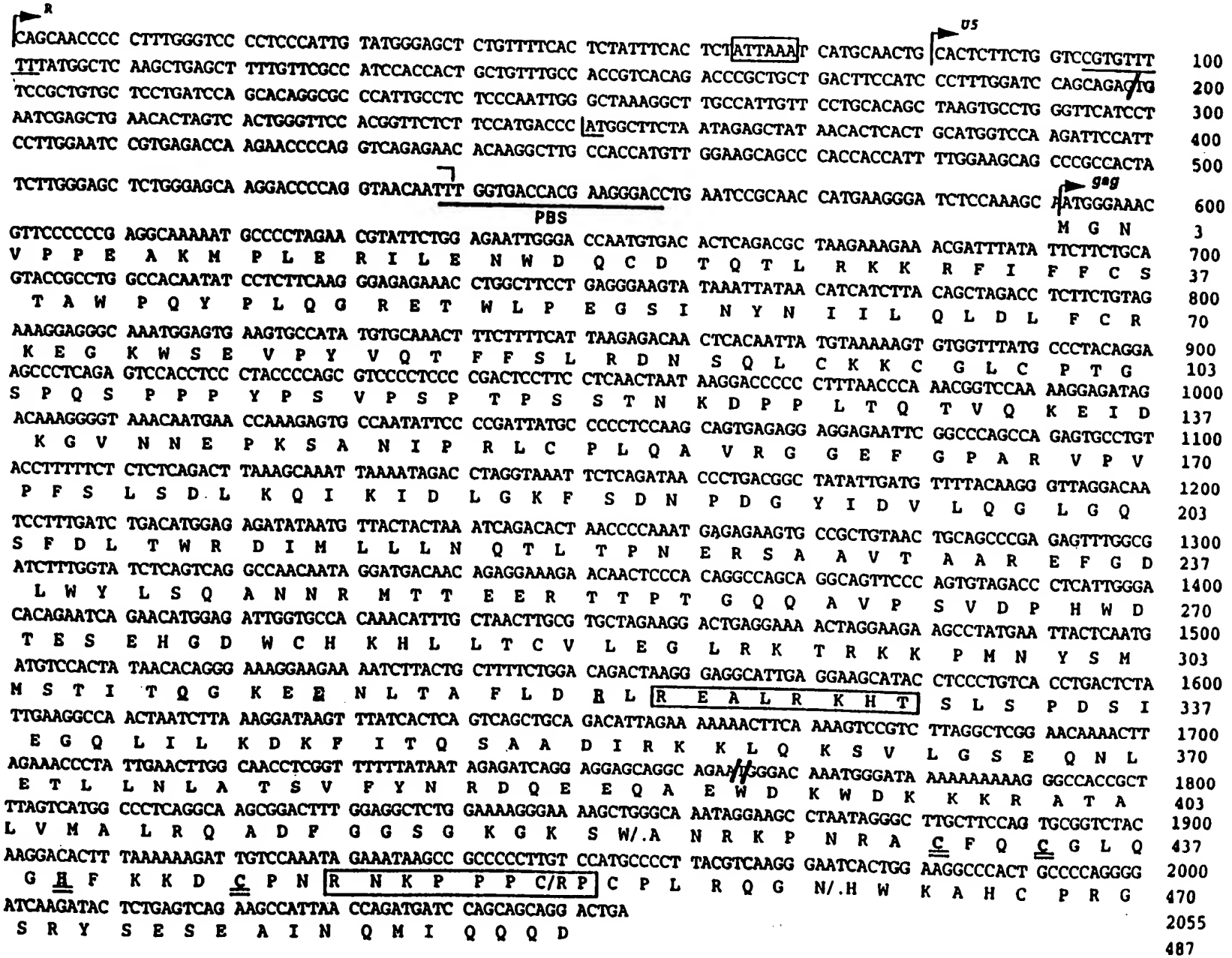


FIG 14




```
                                                
```

FIG 15

```
GGACCCGTAG TATGGGGTAA TCCCCTCCGG GAAACCAAGC CCCAGTACTC AGAAGAAGAA ATAGAATGGG GAACCTCACG AGGACATGGT TTCCTCCCCT   100
G  P  V  V  W  G  N  P  L  R  E  T  K  P  Q  Y  S  E  E  E  I  E  W  G  T  S  R  G  H  G  F  L  P  S          34

CAGGATGGCT AGCCACTGAA GAAGGAAAAA TACTTTTGCT GGCAGCTAAC CAATGGAAAT TACTTAAAAC CCTTCAGCAA ACCTTCCACT TAGGCATTGA   200
  G  W  L  A  T  E  E  G  K  I  L  L  L  A  A  N  Q  W  K  L  L  K  T  L  Q  Q  T  F  H  L  G  I  D            67

TAGCACCCAT CAGATAGCCA AATCATTATT TACTGGACCA GGCCTTTTCA AAACTATCAA GCAGATAGTC AGGGCCTGTG AAGTGTGCCA AAGAAATAAT   300
  S  T  H  Q  I  A  K  S  L  F  T  G  P  G  L  F  K  T  I  K  Q  I  V  R  A  C  E  V  C  Q  R  N  N            100

CCCCTGCCTT ATCGCCAAGC TCCTTCAGGA GAACAAAGAA CAGGCAATTA CCCAAGAGAA GACTGGCAAC TAGATTTTAT CCACATGCCA AAATCACAGG   400
P  L  P  Y  R  Q  A  P  S  G  E  Q  R  T  G  N  Y  P  R  E  D  W  Q  L  D  F  I  H  M  P  K  S  Q  G          134

GATTTCAGTG TCTACTAGTC TGGGTAGATA CTTTCACTGG TTGGGCAGAG GCCTTCCCCT GTAGGACAGA AAAGTTCCAA GAGGTAATAA AGGCACTAGT   500
  F  Q  C  L  L  V  W  V  D  T  F  T  G  W  A  E  A  F  P  C  R  T  E  K  F  Q  E  V  I  K  A  L  V            167

TCATGAAGTA ATTCCCAGAT TCGGACTTCC CTGAGGCTTA CAGAGTGACA ATGGTCCTGC TTTCAAGGCC ACAGTAACCC AGGGAGTATC CCAGGCGTTA   600
H  E  V  I  P  R  F  G  L  P  .  G  L  Q  S  D  N  G  P  A  F  K  A  T  V  T  Q  G  V  S  Q  A  L            200

GGTATAGAAT ATCACTTACA CTGCACCTAG AGGCCACAAT CCTCAGGGAA GGTTGAGAAA ATGAAGACAC TCAAACGACA TCTAAACAAG CTAACCCAGG   700
G  I  E  Y  H  L  H  C  T  .  R  P  Q  S  S  G  K  V  E  K  M  K  T  L  K  R  H  L  N  K  L  T  Q  E          234

AAACCCACCT CGCATGGTCT GCTCTGTTGT CTATAGCCTT ACTAAGAATC CAAAACTCTC CCCAAAAGGC AGGACTTAGC CCATACAGAA TGCTGTATGG   800
  T  H  L  A  W  S  A  L  L  S  I  A  L  L  R  I  Q  N  S  P  Q  K  A  G  L  S  P  Y  R  M  L  Y  G            267

ACGGTCCTTC CTAACCAATG ACCTTCTGCT TGACCAAGAG ATGGCCAACT TAGTTGCAGA CATCACCTCC TTAGCCAAAT ATCAACAAGT TCTTAAAACA   900
R  S  F  L  T  N  D  L  L  L  D  Q  E  M  A  N  L  V  A  D  I  T  S  L  A  K  Y  Q  Q  V  L  K  T            300

TTACAAGGAG CCTGTCCCCG AGAGGAGGGA AAAGAAATAT TCCACCCTGG TGTCATGGTA TTAGTCAAGT CCCTTCCCTC TAATTCCCCA TCCCTAGACA  1000
L  Q  G  A  C  P  R  E  E  G  K  E  I  F  H  P  G  V  M  V  L  V  K  S  L  P  S  M  S  P  S  L  D  T          334

CATCCTGGGG AGGACCCTAC CCAGTCATTT TATCTATCCC AACTGCGGTT AAAGTGGCTG GAGTGGAGTC TTGGATACAT CACACTCGAA TCAAACCCTG  1100
  S  W  G  G  P  Y  P  V  I  L  S  I  P  T  A  V  K  V  A  G  V  E  S  M  I  H  H  T  R  I  K  P  M          367

GATACTGCCG AAGGAACCCG AAAATCCAGG GGACAACGCT AGCTATTTCT TTGAACCTCT AGAGGATCTG TGCCTGCTCT TCAAGCAACA ACCGTGA     1197
I  L  P  K  E  P  E  N  P  G  D  N  A  S  Y  F  F  E  P  L  E  D  L  C  L  L  F  K  Q  Q  P  .                398
```

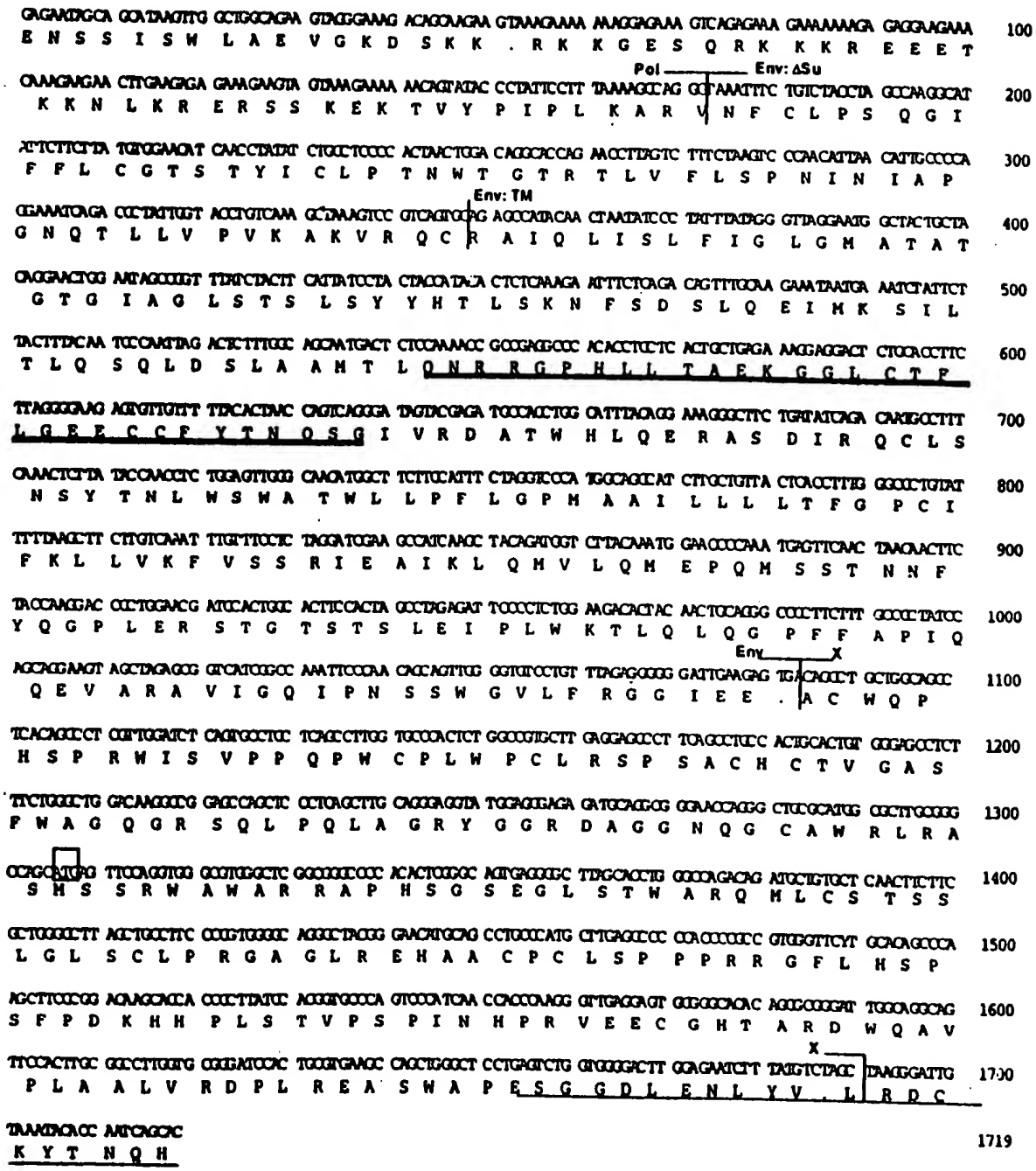



FIG 16